



## ***Interactive comment on “Assessing water footprint of wheat production in China using a crop-model-coupled-statistics approach” by X. C. Cao et al.***

### **Anonymous Referee #2**

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General comments: It is a big challenge to estimate the water footprint of wheat for whole China. This paper presents a framework to define and calculate green water footprint, blue water footprint and total water footprint for irrigated wheat and rain-fed wheat in China. It is a real hard work but the methods are doubtful and the results are unpersuasive.

Special comments: 1.About the data. This paper uses 442 typical irrigation districts to present all the irrigated wheat for 30 provinces. How to treat other irrigated wheat beside these irrigation districts and how to determine the location of other irrigated wheat and rain-fed wheat? The location is necessary when the weather data is used.

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In addition, how the weather data is used? By spatial interpolation?

2.About the water footprint definition. This paper assumes that the irrigated wheat grows with no water stress then defines green water footprint and blue water footprint. For the green water footprint, the potential evapotranspiration (ET) is used to compare with effective precipitation. This assumption not acceptable because only the actual water consumption is valuable in the study on water footprint.

3.About the result of green water footprint. According to the method in this paper, the green water footprint is controlled by potential ET and effective precipitation, so the green water footprint should be similar. Why they are so different in Figure 5? For example, in the southwest, the green water footprint is so larger.

4.English need to be improved a lot.

5.Title. “water footprint of wheat” is better than “water footprint of wheat production”. “crop-model-coupled-statistics” is not reflected in the manuscript. The CROPWAT8.0 is only used to calculate ET<sub>0</sub>, so no crop model is used actually. “coupled” has no corresponding too.

6.P563, Line 17-19, “While the re-used or vegetation consumed part is generally small and should not influence our research findings greatly due to the deep underground water level in most areas of China.” Actually, the groundwater is usual shallow in most irrigation district, so the exchange between surface water and groundwater is so strong that it can not be ignored. So the method to estimate blue water footprint is not unbelievable.

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